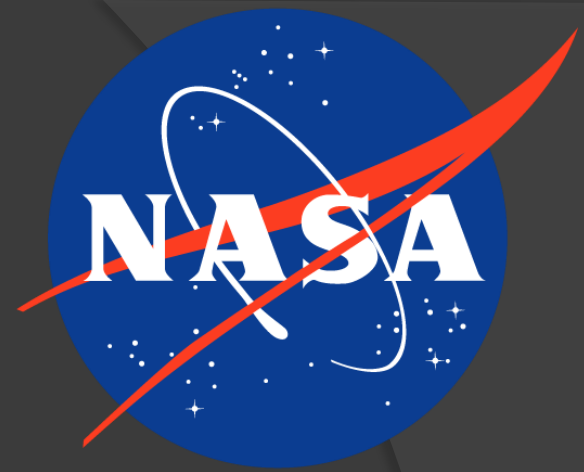


# COMPONENTS OF NASA'S DATA ACQUISITION SYSTEM

Fall Internship, 2015

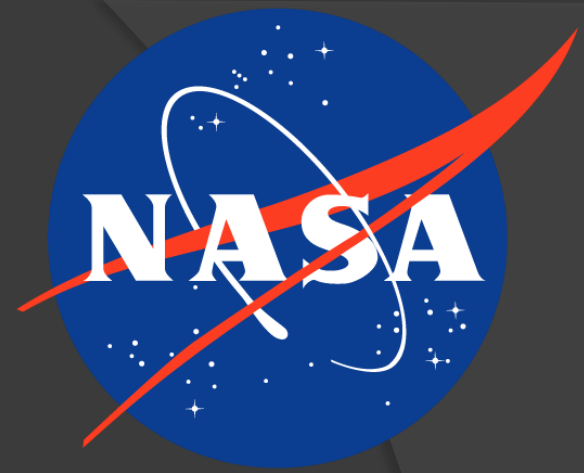
Melanie Schmocker

# Overview



- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

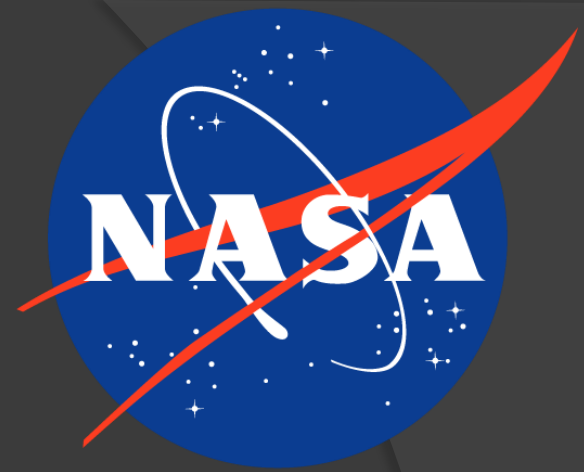
# Overview



- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

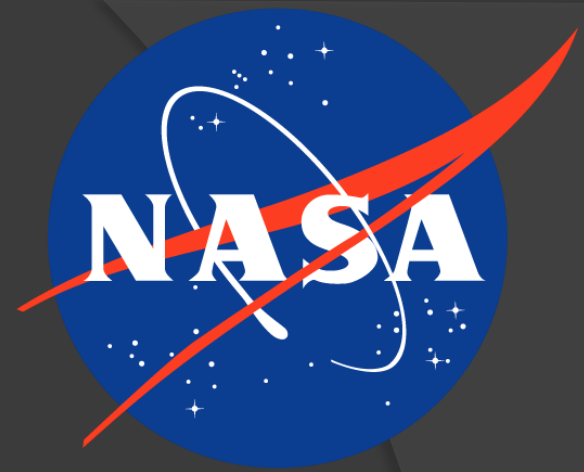
# Context

- Stennis Space Center



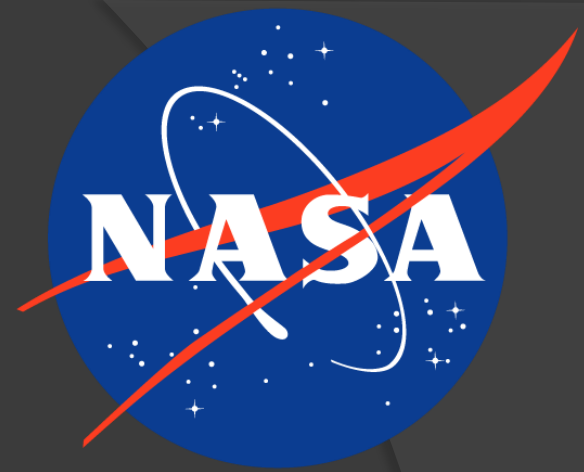
# Context

- Stennis Space Center
  - Test rocket engines



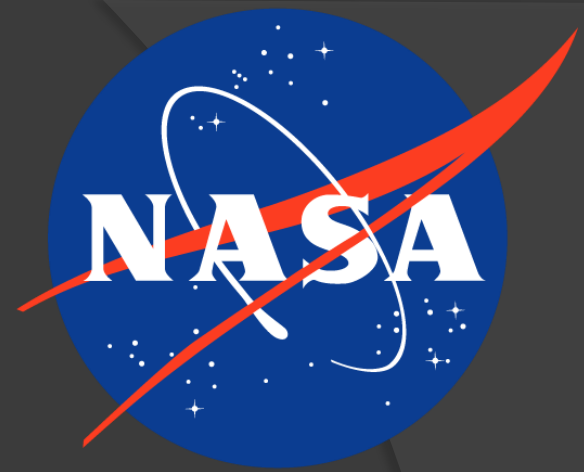
# Context

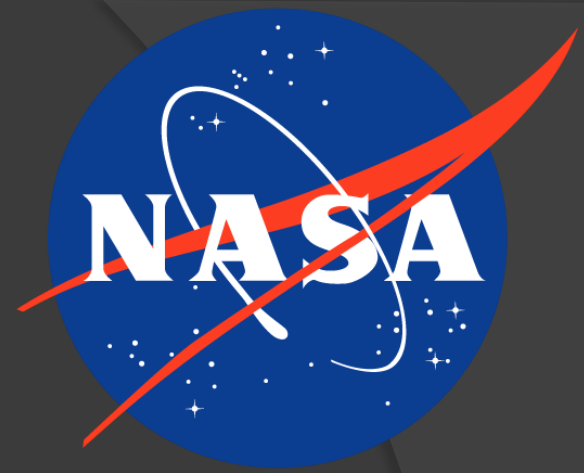
- Stennis Space Center
  - Test rocket engines



# Context

- Stennis Space Center
  - Test rocket engines
- NDAS – NASA's Data Acquisition System



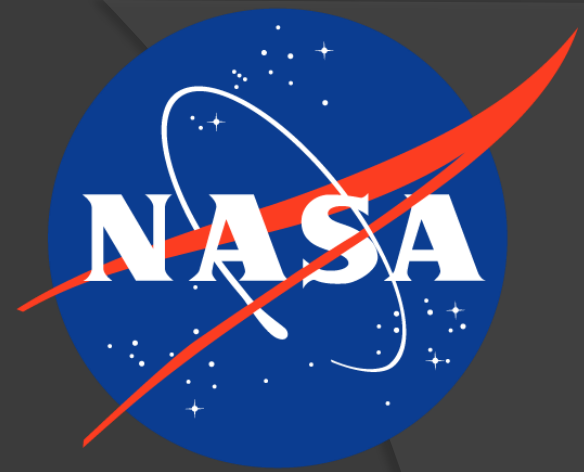


# Context

- Stennis Space Center
    - Test rocket engines
  - NDAS – NASA's Data Acquisition System which can:
    - Calibrate (NCAL)
    - Record (NLOG)
    - Display (NDIS)
    - Export (NGATE)
- and otherwise process data from tests



# Overview



- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

# NOSS Database

## ● NASA's One-Stop Shop



Find Node

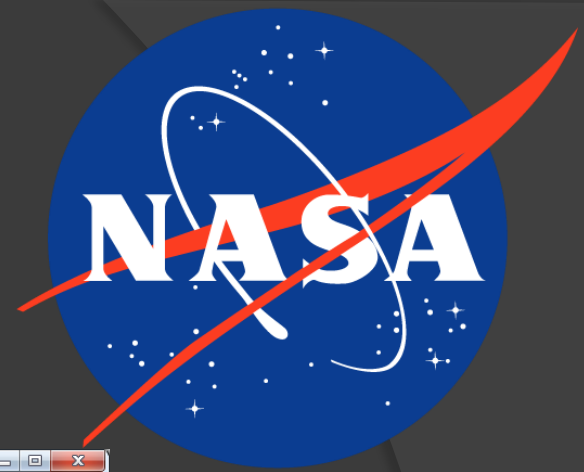
Showing 1-25 of 4,901 items.

#	Node Identifier	Node Type	Notes	Status	Inputs	Outputs	Actions
1	Transducer 206	Generic Transducer	NONE	Operational		Transducer 206	
2	Transducer 207	Generic Transducer	NONE	Operational	0		
3	Transducer 208	Generic Transducer	NONE	Operational	0		
4	Transducer 210	Generic Transducer	NONE	Operational		Transducer 210	
5	Transducer 211	Generic Transducer	NONE	Operational		Transducer 211	
6	Transducer 212	Generic Transducer	NONE	Operational	0		
7	Transducer 213	Generic Transducer	NONE	Operational	0		

Yii Debugger | Yii 2.0.3 | PHP 5.4.31 | Status 200 | Route nodes/find | Log 76 | Time 2,765 ms | Memory 10.0 MB | DB 61 86 ms | Asset Bundles 9

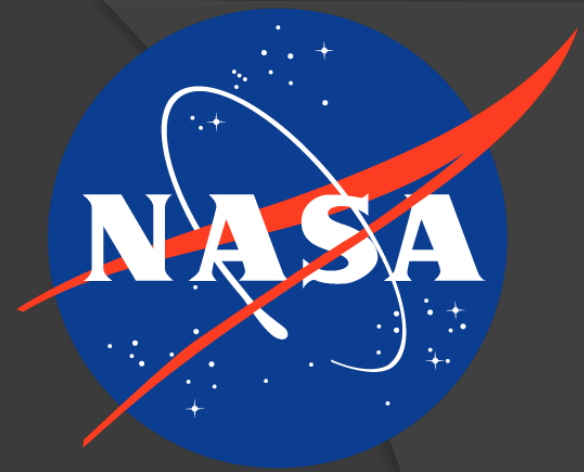
# NOSS Database

- NASA's One-Stop Shop



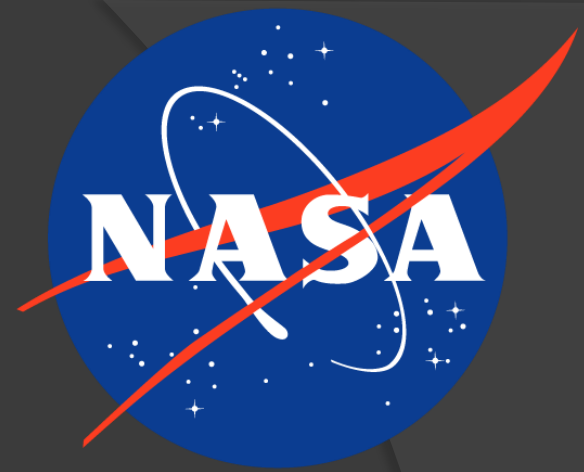
A screenshot of a web browser displaying the NOSS Database interface. The browser's address bar shows the URL "localhost/noss/web/index.php/nodes/update?id=1". The page has a dark navigation bar with the NASA logo and menu items: "NOSS", "Tests", "Measurements", "Nodes", "Calibration", "Actions", "Reports", "Exports", and "Engineer (Engineer)". The main content area is titled "Transducer 206" and contains a form for updating node information. The form fields are: "Node" (with a green "Update" button), "Metadata" (with a "SERIAL\_NUMBER" label and an input field), "IO" (with a "MODEL\_NUMBER" label and an input field), "COEFFICIENTS" (with a "SU\_CODE" label and an input field), "TYPES" (with a "PRECISION\_CODE" label and an input field), and "INSTALL\_DATE" (with an input field). A blue button labeled "ADDITIONAL\_INFO" is located to the left of the "PRECISION\_CODE" field. At the bottom of the browser window, a Yii Debugger toolbar is visible, showing various system metrics such as "Yii 2.0.3", "PHP 5.4.31", "Status 200", "Route nodes/update", "Log 26", "Time 1,228 ms", "Memory 6.2 MB", "DB 12 14 ms", and "Asset Bundles 7".

# Nodes and Measurements



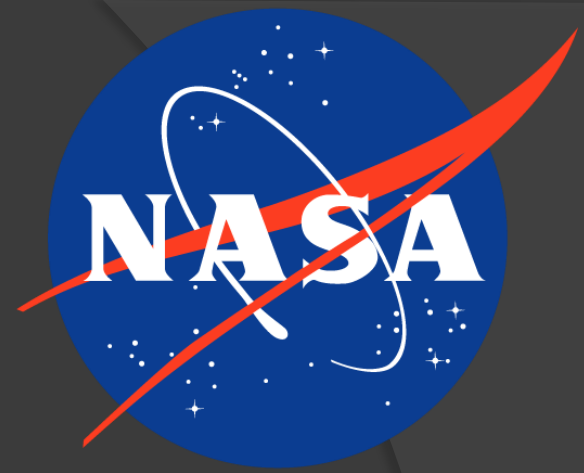
- Each Node represents a piece of hardware on the test stand

# Nodes and Measurements



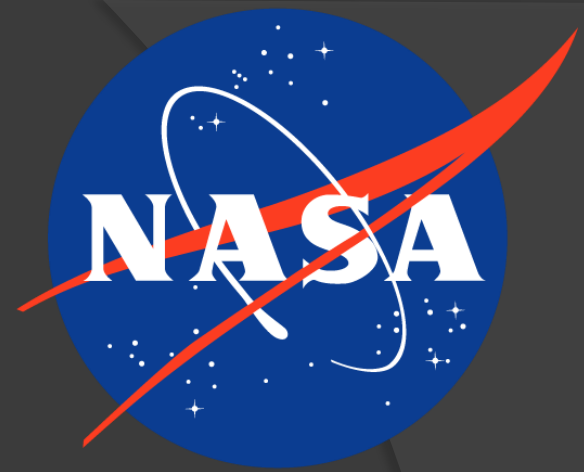
- ⦿ Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers

# Nodes and Measurements



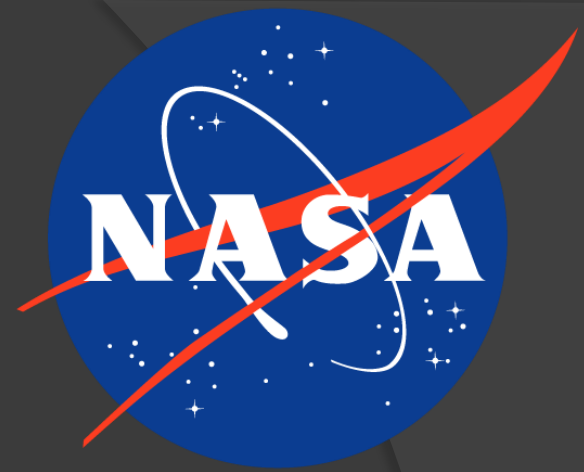
- ⦿ Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers
- ⦿ Measurements are collections of Nodes

# Nodes and Measurements



- ⦿ Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers
- ⦿ Measurements are collections of Nodes
  - Represent Nodes that are physically connected

# Nodes and Measurements

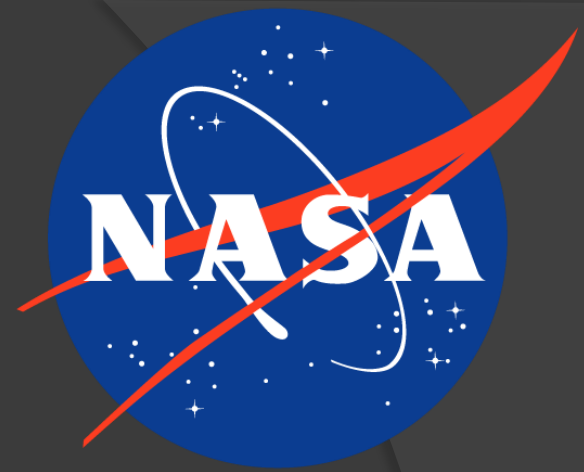


- ⦿ Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers
- ⦿ Measurements are collections of Nodes
  - Represent Nodes that are physically connected
  - Enable intuitive interpretation of data

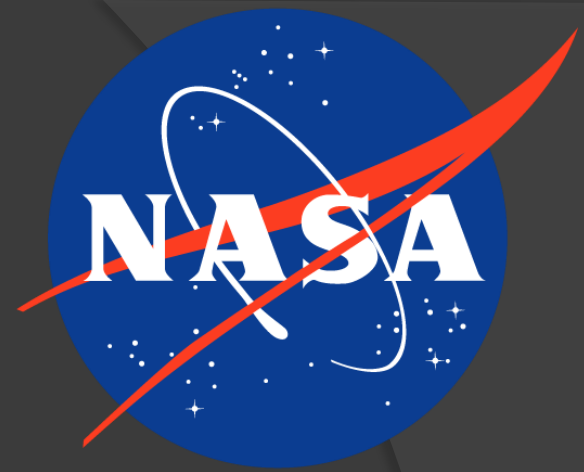


# Adding Nodes

- How to handle new types of hardware?

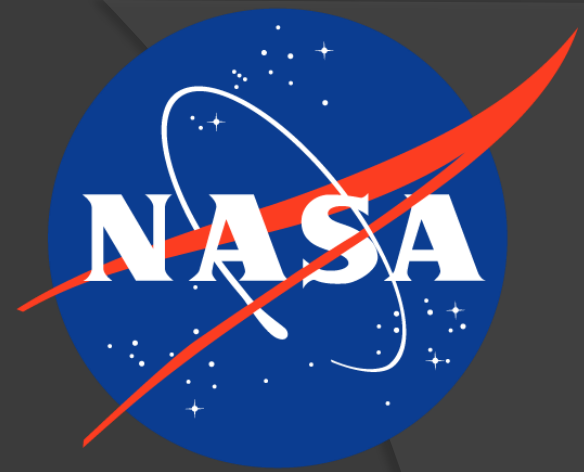


# Adding Nodes



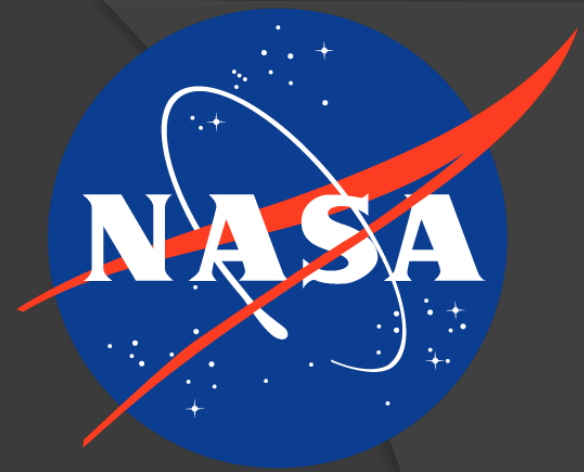
- How to handle new types of hardware?
- Typical database method

# Adding Nodes



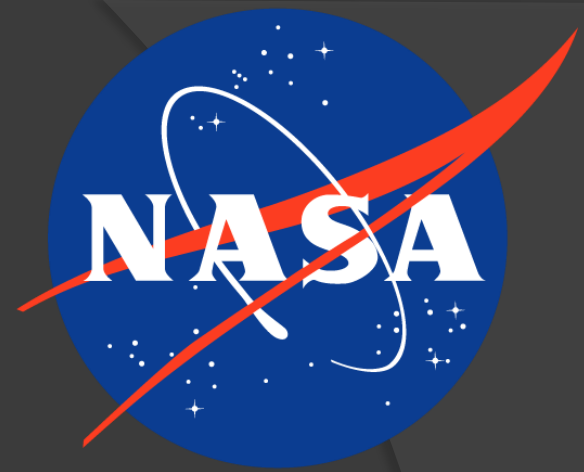
- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database

# Adding Nodes



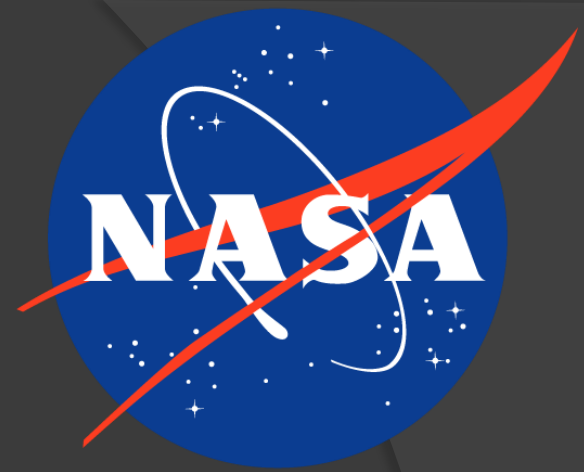
- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method

# Adding Nodes



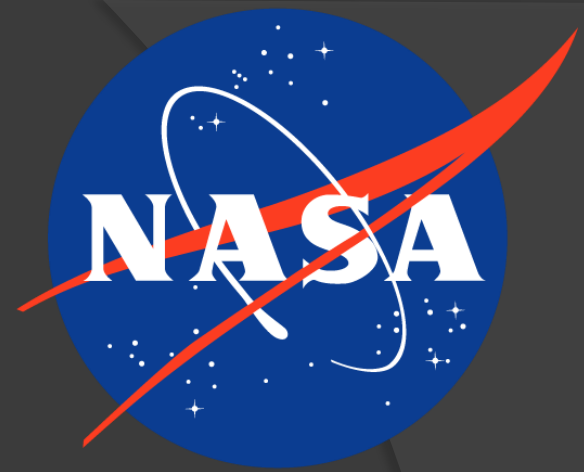
- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method
  - Nodes stored as XML in database

# Adding Nodes



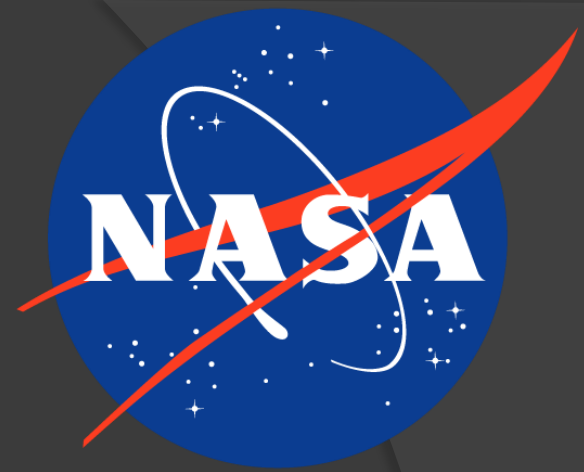
- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method
  - Nodes stored as XML in database
  - Dynamically creates pages to create/update

# Adding Nodes



- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method
  - Nodes stored as XML in database
  - Dynamically creates pages to create/update
  - All XML are text, so no redesign necessary

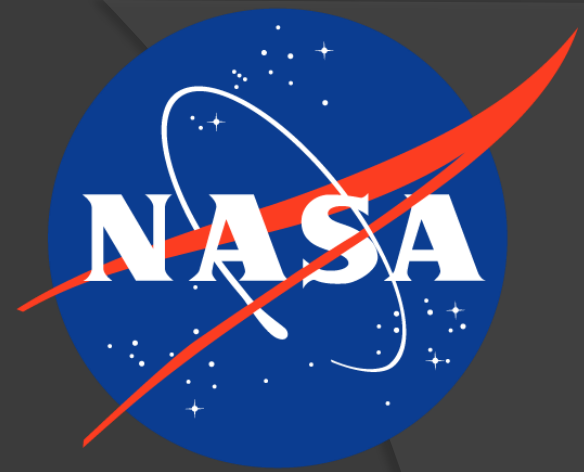
# Adding Nodes



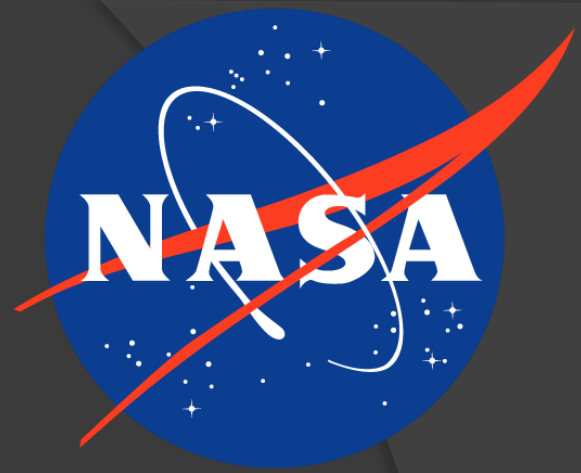
- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method
  - Nodes stored as XML in database
  - Dynamically creates pages to create/update
  - All XML are text, so no redesign necessary
  - All Nodes stored in same table



# Adding Nodes

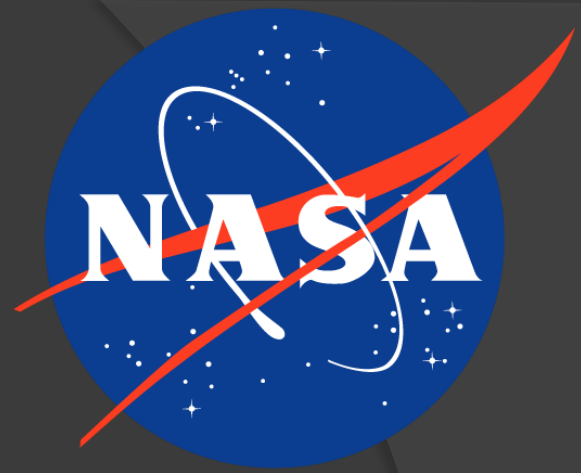


- ⦿ How to handle new types of hardware?
- ⦿ Typical database method
  - Redesign database
- ⦿ NOSS method
  - Nodes stored as XML in database
  - Dynamically creates pages to create/update
  - All XML are text, so no redesign necessary
  - All Nodes stored in same table



# Node Form Updates

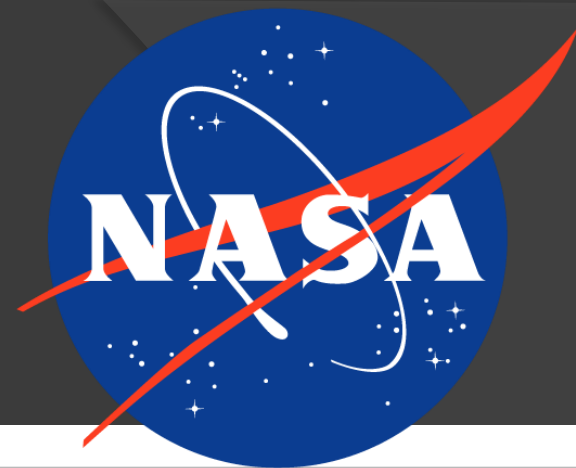
- XSD format



# Node Form Updates

- XSD format

XML Schema Definition

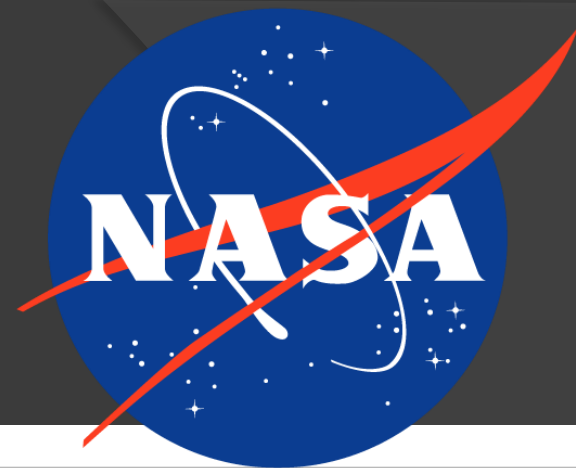


# Node Form Updates

- XSD format

## XML Schema Definition

```
NIRDTableMapping.xml x Generic_Transducer.xsd x
1 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="
  "unqualified" elementFormDefault="qualified">
2 ..
3 ..<xs:element name="GENERIC_TRANSDUCER" type="GenericTransducerType"/>
4 ..
5 ..<xs:complexType name="IOType">
6 ..<xs:sequence>
7 ..<xs:element type="xs:string" name="OUTPUT" maxOccurs="1" minOccurs="1"
8 ..</xs:sequence>
9 ..</xs:complexType>
10 ..
11 ..<xs:complexType name="CoefficientType">
12 ..<xs:sequence>
13 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A0"/>
14 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A1"/>
15 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A2"/>
16 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A3"/>
17 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A4"/>
18 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A5"/>
19 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A6"/>
20 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A7"/>
21 ..</xs:sequence>
22 ..</xs:complexType>
23 ..
24 ..<xs:complexType name="TransducerTypes">
25 ..<xs:sequence>
26 ..<xs:element type="xs:string" name="TRANSDUCER_TYPE"/>
27 ..<xs:element type="xs:float" name="RTP"/>
28 ..<xs:element type="xs:float" name="RTD_MC_T1"/>
29 ..<xs:element type="xs:float" name="RTD_MC_T2"/>
```

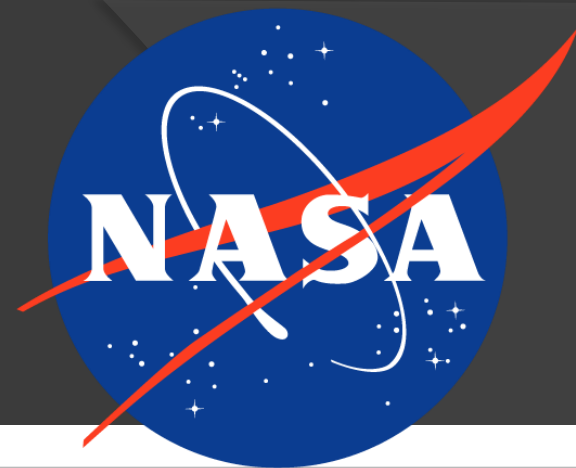


# Node Form Updates

## ● XSD format

- Before me: minimal validations

```
NIRDTableMapping.xml x Generic_Transducer.xsd x
1 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="
  "unqualified" elementFormDefault="qualified">
2 ..
3 ..<xs:element name="GENERIC_TRANSDUCER" type="GenericTransducerType"/>
4 ..
5 ..<xs:complexType name="IOType">
6 ..<xs:sequence>
7 ..<xs:element type="xs:string" name="OUTPUT" maxOccurs="1" minOccurs="1"
8 ..</xs:sequence>
9 ..</xs:complexType>
10 ..
11 ..<xs:complexType name="CoefficientType">
12 ..<xs:sequence>
13 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A0"/>
14 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A1"/>
15 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A2"/>
16 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A3"/>
17 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A4"/>
18 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A5"/>
19 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A6"/>
20 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A7"/>
21 ..</xs:sequence>
22 ..</xs:complexType>
23 ..
24 ..<xs:complexType name="TransducerTypes">
25 ..<xs:sequence>
26 ..<xs:element type="xs:string" name="TRANSDUCER_TYPE"/>
27 ..<xs:element type="xs:float" name="RTP"/>
28 ..<xs:element type="xs:float" name="RTD_MC_T1"/>
29 ..<xs:element type="xs:float" name="RTD_MC_T2"/>
```

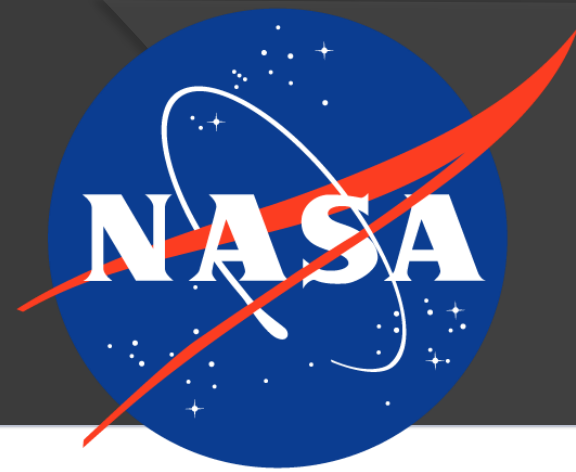


# Node Form Updates

## ● XSD format

- Before me: minimal validations
- My tasks
  - Update XPath references

```
NIRDTableMapping.xml x Generic_Transducer.xsd x
1 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="
  "unqualified" elementFormDefault="qualified">
2 ..
3 ..<xs:element name="GENERIC_TRANSDUCER" type="GenericTransducerType"/>
4 ..
5 ..<xs:complexType name="IOType">
6 ..<xs:sequence>
7 ..<xs:element type="xs:string" name="OUTPUT" maxOccurs="1" minOccurs="1"
8 ..</xs:sequence>
9 ..</xs:complexType>
10 ..
11 ..<xs:complexType name="CoefficientType">
12 ..<xs:sequence>
13 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A0"/>
14 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A1"/>
15 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A2"/>
16 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A3"/>
17 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A4"/>
18 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A5"/>
19 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A6"/>
20 ..<xs:element type="xs:float" name="ACTUAL_COEFFICIENT_A7"/>
21 ..</xs:sequence>
22 ..</xs:complexType>
23 ..
24 ..<xs:complexType name="TransducerTypes">
25 ..<xs:sequence>
26 ..<xs:element type="xs:string" name="TRANSDUCER_TYPE"/>
27 ..<xs:element type="xs:float" name="RTP"/>
28 ..<xs:element type="xs:float" name="RTD_MC_T1"/>
29 ..<xs:element type="xs:float" name="RTD_MC_T2"/>
```

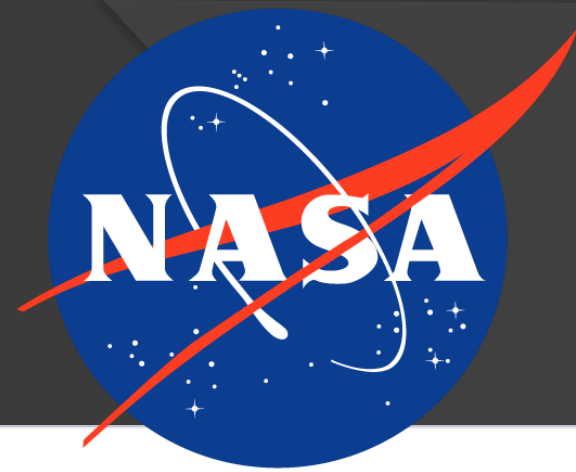


# Node Form Updates

## ⦿ XSD format

- Before me: minimal validation done
- My tasks
  - Update XPath references
  - Enforce all XSD validations in browser form

```
demonstration.xsd x
44 <xs:complexType name="BaseDemoType">
45   <xs:sequence>
46     <xs:element name="NUMBERS" type="numberType"/>
47     <xs:element name="STRINGS" type="stringType"/>
48     <xs:element name="OTHERS" type="otherType"/>
49   </xs:sequence>
50 </xs:complexType>
51
52
53 <xs:complexType name="numberType">
54   <xs:sequence>
55     <xs:element name="INCLUSIVE_BOUNDARIES_0_TO_100">
56       <xs:simpleType>
57         <xs:restriction base="xs:integer">
58           <!-- restricts acceptable inputs to integers -->
59           <xs:minInclusive value="0"/>
60           <xs:maxInclusive value="100"/>
61           <!-- Allows values between min and max, including the boundaries -->
62         </xs:restriction>
63       </xs:simpleType>
64     </xs:element>
65     <xs:element name="EXCLUSIVE_BOUNDARIES_0_TO_100">
66       <xs:simpleType>
67         <xs:restriction base="xs:float">
68           <xs:minExclusive value="0"/>
69           <xs:maxExclusive value="100"/>
70           <!-- Allows values larger than min and smaller than max -->
71         </xs:restriction>
72       </xs:simpleType>
73     </xs:element>
74   </xs:sequence>
75 </xs:complexType>
```



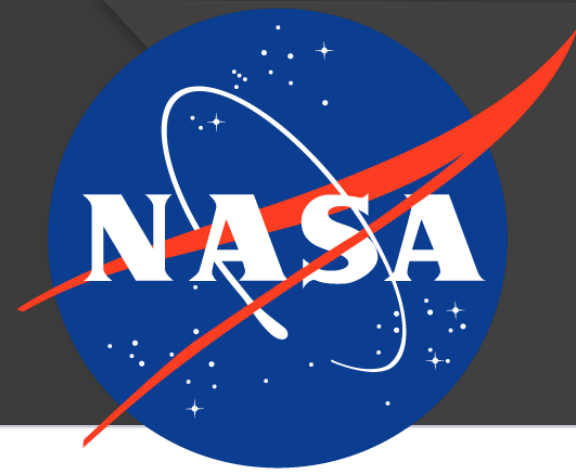
# Node Form Updates

- XSD format
  - Restrictions
  - Extensions

```
demonstration.xsd x
44 <xs:complexType name="BaseDemoType">
45   <xs:sequence>
46     <xs:element name="NUMBERS" type="numberType"/>
47     <xs:element name="STRINGS" type="stringType"/>
48     <xs:element name="OTHERS" type="otherType"/>
49   </xs:sequence>
50 </xs:complexType>
51
52
53 <xs:complexType name="numberType">
54   <xs:sequence>
55     <xs:element name="INCLUSIVE_BOUNDARIES_0_TO_100">
56       <xs:simpleType>
57         <xs:restriction base="xs:integer">
58           <!-- restricts acceptable inputs to integers -->
59           <xs:minInclusive value="0"/>
60           <xs:maxInclusive value="100"/>
61           <!-- Allows values between min and max, including the boundaries -->
62         </xs:restriction>
63       </xs:simpleType>
64     </xs:element>
65     <xs:element name="EXCLUSIVE_BOUNDARIES_0_TO_100">
66       <xs:simpleType>
67         <xs:restriction base="xs:float">
68           <xs:minExclusive value="0"/>
69           <xs:maxExclusive value="100"/>
70           <!-- Allows values larger than min and smaller than max -->
71         </xs:restriction>
72       </xs:simpleType>
73     </xs:element>

```



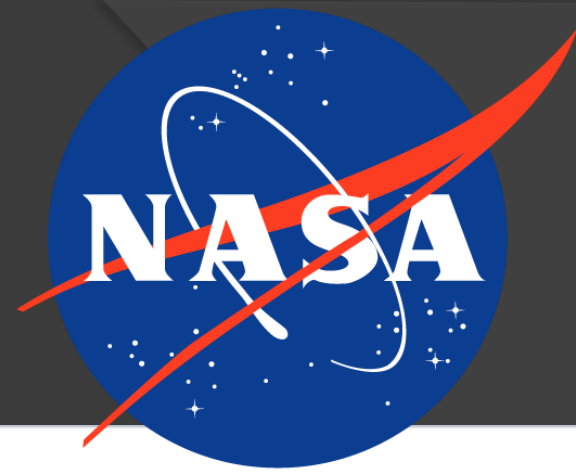


# Node Form Updates

## ⦿ XSD format

- Restrictions
  - Limit values stored
- Extensions

```
demonstration.xsd x
44 <xs:complexType name="BaseDemoType">
45   <xs:sequence>
46     <xs:element name="NUMBERS" type="numberType"/>
47     <xs:element name="STRINGS" type="stringType"/>
48     <xs:element name="OTHERS" type="otherType"/>
49   </xs:sequence>
50 </xs:complexType>
51
52
53 <xs:complexType name="numberType">
54   <xs:sequence>
55     <xs:element name="INCLUSIVE_BOUNDARIES_0_TO_100">
56       <xs:simpleType>
57         <xs:restriction base="xs:integer">
58           <!-- restricts acceptable inputs to integers -->
59           <xs:minInclusive value="0"/>
60           <xs:maxInclusive value="100"/>
61           <!-- Allows values between min and max, including the boundaries -->
62         </xs:restriction>
63       </xs:simpleType>
64     </xs:element>
65     <xs:element name="EXCLUSIVE_BOUNDARIES_0_TO_100">
66       <xs:simpleType>
67         <xs:restriction base="xs:float">
68           <xs:minExclusive value="0"/>
69           <xs:maxExclusive value="100"/>
70           <!-- Allows values larger than min and smaller than max -->
71         </xs:restriction>
72       </xs:simpleType>
73     </xs:element>
74   </xs:sequence>
75 </xs:complexType>
```



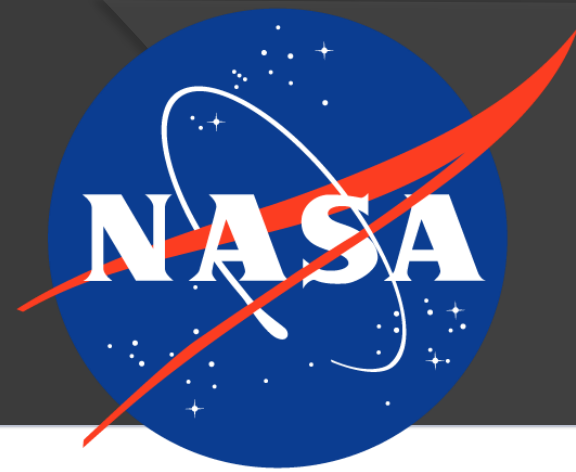
# Node Form Updates

## ● XSD format

- Restrictions
  - Limit values stored
- Extensions
  - Add attributes to XML

```
demonstration.xsd x
44 <xs:complexType name="BaseDemoType">
45   <xs:sequence>
46     <xs:element name="NUMBERS" type="numberType"/>
47     <xs:element name="STRINGS" type="stringType"/>
48     <xs:element name="OTHERS" type="otherType"/>
49   </xs:sequence>
50 </xs:complexType>
51
52
53 <xs:complexType name="numberType">
54   <xs:sequence>
55     <xs:element name="INCLUSIVE_BOUNDARIES_0_TO_100">
56       <xs:simpleType>
57         <xs:restriction base="xs:integer">
58           <!-- restricts acceptable inputs to integers -->
59           <xs:minInclusive value="0"/>
60           <xs:maxInclusive value="100"/>
61           <!-- Allows values between min and max, including the boundaries -->
62         </xs:restriction>
63       </xs:simpleType>
64     </xs:element>
65     <xs:element name="EXCLUSIVE_BOUNDARIES_0_TO_100">
66       <xs:simpleType>
67         <xs:restriction base="xs:float">
68           <xs:minExclusive value="0"/>
69           <xs:maxExclusive value="100"/>
70           <!-- Allows values larger than min and smaller than max -->
71         </xs:restriction>
72       </xs:simpleType>
73     </xs:element>

```



# Node Form Updates

## ⦿ XSD format

- Restrictions
  - Limit values stored
- Extensions
  - Add attributes to XML

## ⦿ Validations

```
demonstration.xsd x
44 <xs:complexType name="BaseDemoType">
45   <xs:sequence>
46     <xs:element name="NUMBERS" type="numberType"/>
47     <xs:element name="STRINGS" type="stringType"/>
48     <xs:element name="OTHERS" type="otherType"/>
49   </xs:sequence>
50 </xs:complexType>
51
52
53 <xs:complexType name="numberType">
54   <xs:sequence>
55     <xs:element name="INCLUSIVE_BOUNDARIES_0_TO_100">
56       <xs:simpleType>
57         <xs:restriction base="xs:integer">
58           <!-- restricts acceptable inputs to integers -->
59           <xs:minInclusive value="0"/>
60           <xs:maxInclusive value="100"/>
61           <!-- Allows values between min and max, including the boundaries -->
62         </xs:restriction>
63       </xs:simpleType>
64     </xs:element>
65     <xs:element name="EXCLUSIVE_BOUNDARIES_0_TO_100">
66       <xs:simpleType>
67         <xs:restriction base="xs:float">
68           <xs:minExclusive value="0"/>
69           <xs:maxExclusive value="100"/>
70           <!-- Allows values larger than min and smaller than max -->
71         </xs:restriction>
72       </xs:simpleType>
73     </xs:element>
74   </xs:sequence>
75 </xs:complexType>
```

# Validations

- ◉ No input

REGEX\_PATTERN

- ◉ Invalid input

REGEX\_PATTERN

REGEX\_PATTERN is invalid. It should match the regex `/^s*([a-zA-Z]+\s*)+[0-9]+\s*$`

- ◉ Valid input

REGEX\_PATTERN

# Validations

- ◉ No input

REGEX\_PATTERN

- ◉ Invalid input

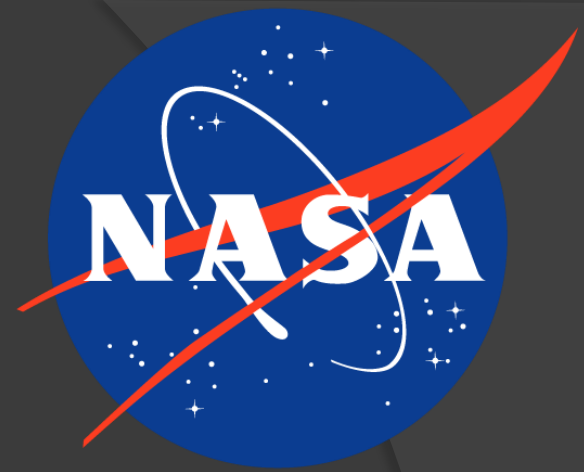
REGEX\_PATTERN

Value should be words followed by a number

- ◉ Valid input

REGEX\_PATTERN

# Overview

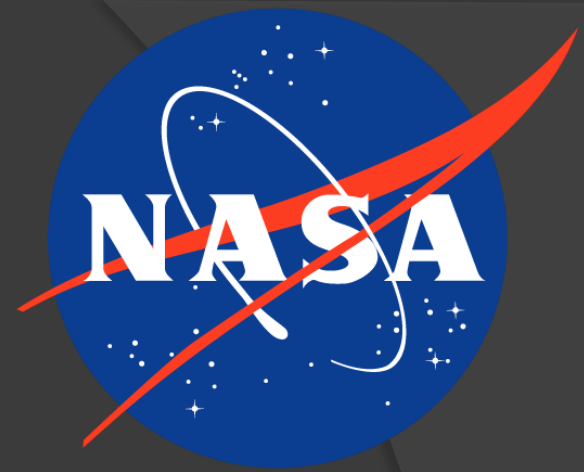


- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

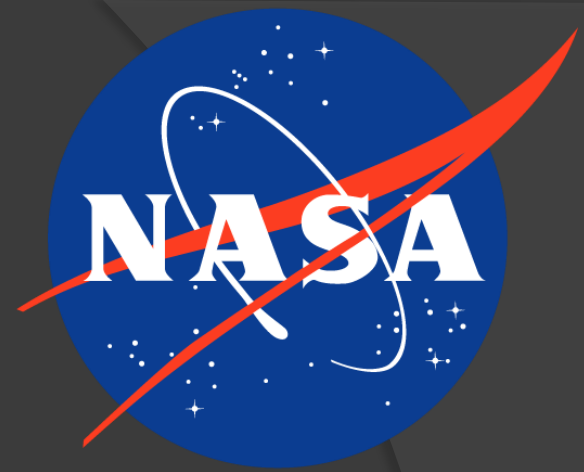
# NCAL

- Calibrates Measurements

- May also compare against a trusted prior calibration



# NCAL



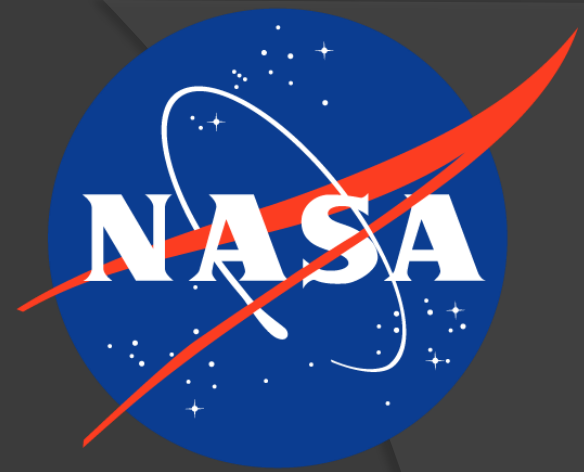
- Calibrates Measurements

- May also compare against a trusted prior calibration

- Produces a Calibration Report



# NCAL



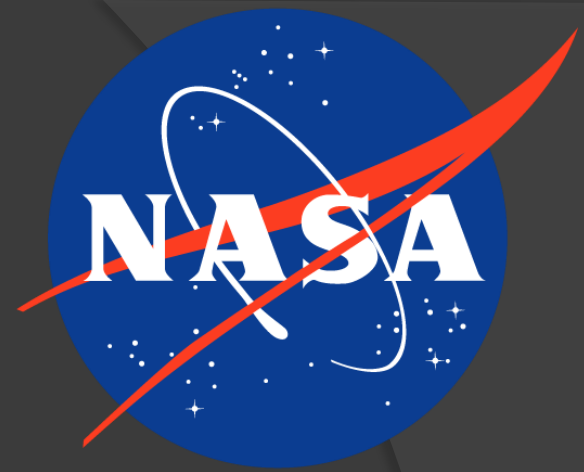
- Calibrates Measurements

- May also compare against a trusted prior calibration

- Produces a Calibration Report

- Sensors calibrated at different points throughout the range of expected values

# NCAL



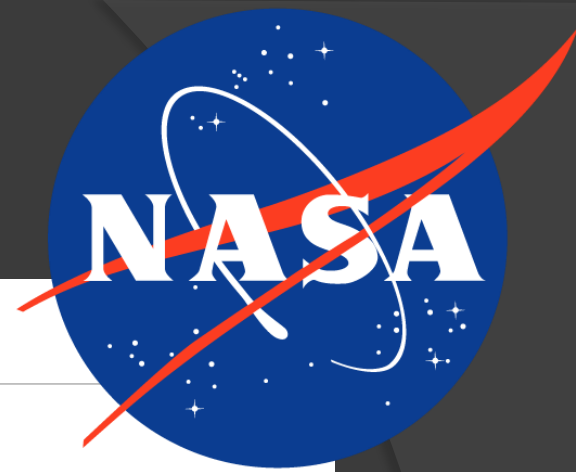
- Calibrates Measurements

- May also compare against a trusted prior calibration

- Produces a Calibration Report

- Sensors calibrated at different points throughout the range of expected values
- Report is HTML but must also be printable

# Calibration Report Updates



● Prior format

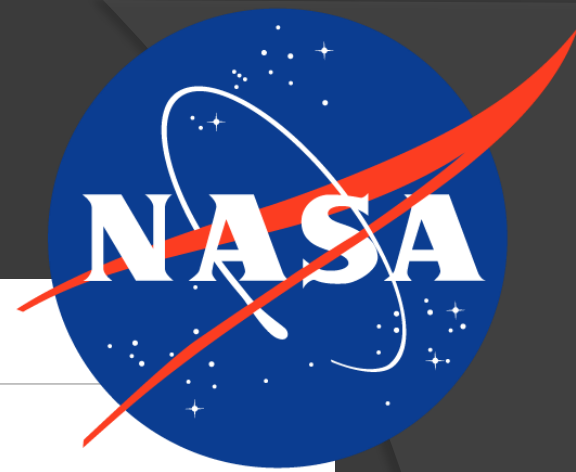
## NDAS Daily Cal Report

TEST STAND	
OPERATOR	
CAL DATE	
DATA BASE MDID	
REF CAL DATE	
TEST NUMBER	

This page was created on Thu Nov 12 2015 at 16:10:59

CAL FILE	AMP	MEASUREMENT ID	PASS	PREAMB COUNTS	0 CAL	80 CAL	POSTAMB COUNTS	NCAL C0	NCAL C1	Description
CURRENT	0	CUI-000	0	15 <sup>SEC</sup>	47	23437	20 <sup>ST</sup>	-0.060581 <sup>ST</sup>	11.262982 <sup>ST</sup>	Test Channel 0
ANCILLARY	1 <sup>ST</sup>	PSIG <sup>ST</sup>	0 <sup>ST</sup>	5 <sup>N.PRE</sup>	4 <sup>N.S</sup>	5 <sup>N.S</sup>	4 <sup>N.PST</sup>	23420 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	1	CUI-001	0	32767 <sup>SEC</sup>	84767	84767	32767 <sup>ST</sup>	0.000000 <sup>ST</sup>	1.000000 <sup>ST</sup>	Test Channel 1
ANCILLARY	2 <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	0 <sup>N.PRE</sup>	0 <sup>N.S</sup>	0 <sup>N.S</sup>	0 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	2	CUI-002	0	8319 <sup>SEC</sup>	8404	8382	8321 <sup>ST</sup>	886.795410 <sup>ST</sup>	-344.591949 <sup>ST</sup>	Test Channel 2
ANCILLARY	A <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	195 <sup>N.PRE</sup>	187 <sup>N.S</sup>	154 <sup>N.S</sup>	159 <sup>N.PST</sup>	-11 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	3	CUI-003	0	2070 <sup>SEC</sup>	2037	1989	2085 <sup>ST</sup>	65.478905 <sup>ST</sup>	-84.392159 <sup>ST</sup>	Test Channel 3
ANCILLARY	B <sup>ND</sup>	PSIG <sup>ST</sup>	0 <sup>ST</sup>	129 <sup>N.PRE</sup>	81 <sup>N.S</sup>	117 <sup>N.S</sup>	75 <sup>N.PST</sup>	-47 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	4	CUI-004	0	18783 <sup>SEC</sup>	18855	18801	18988 <sup>ST</sup>	426.630859 <sup>ST</sup>	-73.618820 <sup>ST</sup>	Test Channel 4
ANCILLARY	A <sup>ND</sup>	PSIA <sup>ST</sup>	0 <sup>ST</sup>	176 <sup>N.PRE</sup>	198 <sup>N.S</sup>	290 <sup>N.S</sup>	279 <sup>N.PST</sup>	-54 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	5	CUI-005	0	11504 <sup>SEC</sup>	11554	11517	11548 <sup>ST</sup>	393.379669 <sup>ST</sup>	-110.711685 <sup>ST</sup>	Test Channel 5
ANCILLARY	B <sup>ND</sup>	TEST <sup>ST</sup>	0 <sup>ST</sup>	137 <sup>N.PRE</sup>	102 <sup>N.S</sup>	104 <sup>N.S</sup>	120 <sup>N.PST</sup>	-36 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	6	CUI-006	0	22042 <sup>SEC</sup>	21889	22003	21919 <sup>ST</sup>	-234.164505 <sup>ST</sup>	35.502769 <sup>ST</sup>	Test Channel 6
ANCILLARY	A <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	158 <sup>N.PRE</sup>	228 <sup>N.S</sup>	177 <sup>N.S</sup>	170 <sup>N.PST</sup>	113 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	7	CUI-007	1	10383 <sup>SEC</sup>	84	84	10295 <sup>ST</sup>	-332.067383 <sup>ST</sup>	-16958.101562 <sup>ST</sup>	Test Channel 7
ANCILLARY	B <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	98 <sup>N.PRE</sup>	4 <sup>N.S</sup>	5 <sup>N.S</sup>	118 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	8	CUI-008	1	-32768 <sup>SEC</sup>	80	80	-32768 <sup>ST</sup>	-82.248108 <sup>ST</sup>	4518.101074 <sup>ST</sup>	Test Channel 8
ANCILLARY	A <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	0 <sup>N.PRE</sup>	5 <sup>N.S</sup>	4 <sup>N.S</sup>	0 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	9	CUI-009	0	602 <sup>SEC</sup>	640	-1434	645 <sup>ST</sup>	3.381169 <sup>ST</sup>	-1.948625 <sup>ST</sup>	Test Channel 9
ANCILLARY	B <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	91 <sup>N.PRE</sup>	120 <sup>N.S</sup>	142 <sup>N.S</sup>	103 <sup>N.PST</sup>	-2075 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	10	CUI-010	1	8442 <sup>SEC</sup>	0	0	-8438 <sup>ST</sup>	-1.160327 <sup>ST</sup>	15439.156250 <sup>ST</sup>	Test Channel 10
ANCILLARY	A <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	309 <sup>N.PRE</sup>	5 <sup>N.S</sup>	4 <sup>N.S</sup>	195 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	11	CUI-011	1	9369 <sup>SEC</sup>	1	2	9344 <sup>ST</sup>	-7.753644 <sup>ST</sup>	-12366.498047 <sup>ST</sup>	Test Channel 11
ANCILLARY	B <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	67 <sup>N.PRE</sup>	5 <sup>N.S</sup>	5 <sup>N.S</sup>	86 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	
CURRENT	12	CUI-012	1	5154 <sup>SEC</sup>	1	1	-5049 <sup>ST</sup>	-42.772984 <sup>ST</sup>	96401.343750 <sup>ST</sup>	Test Channel 12
ANCILLARY	A <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	240 <sup>N.PRE</sup>	4 <sup>N.S</sup>	4 <sup>N.S</sup>	199 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>ST</sup>	

# Calibration Report Updates



● Prior format

● Refactor HTML

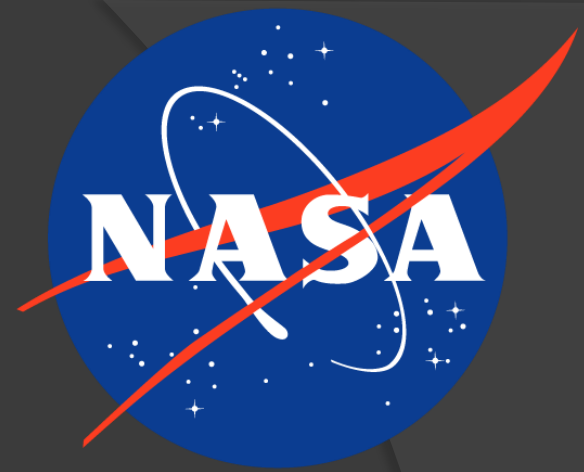
## NDAS Daily Cal Report

TEST STAND	
OPERATOR	
CAL DATE	
DATA BASE MDID	
REF CAL DATE	
TEST NUMBER	

This page was created on Thu Nov 12 2015 at 16:10:59

CAL FILE	AMP	MEASUREMENT ID	PASS	PREAMB COUNTS	0 CAL	80 CAL	POSTAMB COUNTS	NCAL C0	NCAL C1	Description
CURRENT	0	CUI-000	0	15 <sup>SEC</sup>	47	23437	20 <sup>ST</sup>	-0.060581 <sup>SEC</sup>	11.262982 <sup>SEC</sup>	Test Channel 0
ANCILLARY	1 <sup>ST</sup>	PSIG <sup>ST</sup>	0 <sup>ST</sup>	5 <sup>N.PRE</sup>	4 <sup>N.S</sup>	5 <sup>N.S</sup>	4 <sup>N.PST</sup>	23420 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	1	CUI-001	0	32767 <sup>SEC</sup>	84767	84767	32767 <sup>SEC</sup>	0.000000 <sup>SEC</sup>	1.000000 <sup>SEC</sup>	Test Channel 1
ANCILLARY	2 <sup>ND</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	0 <sup>N.PRE</sup>	0 <sup>N.S</sup>	0 <sup>N.S</sup>	0 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	2	CUI-002	0	8319 <sup>SEC</sup>	8404	8382	8321 <sup>ST</sup>	886.795410 <sup>SEC</sup>	-344.591949 <sup>SEC</sup>	Test Channel 2
ANCILLARY	A <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	195 <sup>N.PRE</sup>	187 <sup>N.S</sup>	154 <sup>N.S</sup>	159 <sup>N.PST</sup>	-11 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	3	CUI-003	0	2070 <sup>SEC</sup>	2037	1989	2085 <sup>ST</sup>	65.478905 <sup>SEC</sup>	-84.392159 <sup>SEC</sup>	Test Channel 3
ANCILLARY	B <sup>1ST</sup>	PSIG <sup>ST</sup>	0 <sup>ST</sup>	129 <sup>N.PRE</sup>	81 <sup>N.S</sup>	117 <sup>N.S</sup>	75 <sup>N.PST</sup>	-47 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	4	CUI-004	0	18783 <sup>SEC</sup>	18855	18801	18988 <sup>ST</sup>	426.630859 <sup>SEC</sup>	-73.618820 <sup>SEC</sup>	Test Channel 4
ANCILLARY	A <sup>1ST</sup>	PSIA <sup>ST</sup>	0 <sup>ST</sup>	176 <sup>N.PRE</sup>	198 <sup>N.S</sup>	290 <sup>N.S</sup>	279 <sup>N.PST</sup>	-54 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	5	CUI-005	0	11504 <sup>SEC</sup>	11554	11517	11548 <sup>ST</sup>	393.379669 <sup>SEC</sup>	-110.711685 <sup>SEC</sup>	Test Channel 5
ANCILLARY	B <sup>1ST</sup>	TEST <sup>ST</sup>	0 <sup>ST</sup>	137 <sup>N.PRE</sup>	102 <sup>N.S</sup>	104 <sup>N.S</sup>	120 <sup>N.PST</sup>	-36 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	6	CUI-006	0	22042 <sup>SEC</sup>	21889	22003	21919 <sup>ST</sup>	-234.164505 <sup>SEC</sup>	35.502769 <sup>SEC</sup>	Test Channel 6
ANCILLARY	A <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	158 <sup>N.PRE</sup>	228 <sup>N.S</sup>	177 <sup>N.S</sup>	170 <sup>N.PST</sup>	113 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	7	CUI-007	1	10383 <sup>SEC</sup>	84	84	10295 <sup>ST</sup>	-332.067383 <sup>SEC</sup>	-16958.101562 <sup>SEC</sup>	Test Channel 7
ANCILLARY	B <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	98 <sup>N.PRE</sup>	4 <sup>N.S</sup>	5 <sup>N.S</sup>	118 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	8	CUI-008	1	-32768 <sup>SEC</sup>	80	80	-32768 <sup>SEC</sup>	-82.248108 <sup>SEC</sup>	4518.101074 <sup>SEC</sup>	Test Channel 8
ANCILLARY	A <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	0 <sup>N.PRE</sup>	5 <sup>N.S</sup>	4 <sup>N.S</sup>	0 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	9	CUI-009	0	602 <sup>SEC</sup>	640	-1434	645 <sup>ST</sup>	3.381169 <sup>SEC</sup>	-1.948625 <sup>SEC</sup>	Test Channel 9
ANCILLARY	B <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	91 <sup>N.PRE</sup>	120 <sup>N.S</sup>	142 <sup>N.S</sup>	103 <sup>N.PST</sup>	-2075 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	10	CUI-010	1	8442 <sup>SEC</sup>	0	0	-8438 <sup>SEC</sup>	-1.160327 <sup>SEC</sup>	15439.156250 <sup>SEC</sup>	Test Channel 10
ANCILLARY	A <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	309 <sup>N.PRE</sup>	5 <sup>N.S</sup>	0	195 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	11	CUI-011	1	9369 <sup>SEC</sup>	1	2	9344 <sup>SEC</sup>	-7.753644 <sup>SEC</sup>	-12366.498047 <sup>SEC</sup>	Test Channel 11
ANCILLARY	B <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	67 <sup>N.PRE</sup>	5 <sup>N.S</sup>	5 <sup>N.S</sup>	86 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	
CURRENT	12	CUI-012	1	5154 <sup>SEC</sup>	1	1	-5049 <sup>SEC</sup>	-42.772984 <sup>SEC</sup>	96401.343750 <sup>SEC</sup>	Test Channel 12
ANCILLARY	A <sup>1ST</sup>	DegR <sup>ST</sup>	0 <sup>ST</sup>	240 <sup>N.PRE</sup>	4 <sup>N.S</sup>	4 <sup>N.S</sup>	199 <sup>N.PST</sup>	0 <sup>SEC</sup>	0 <sup>SEC</sup>	

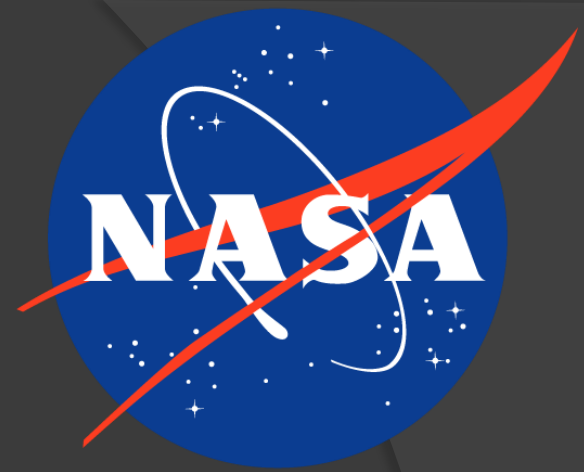
# Calibration Report Updates



- Prior format
- Refactor HTML
- Add interactive data

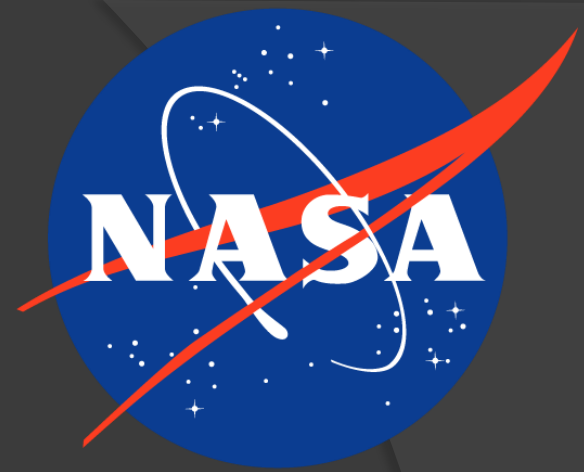
ANCILLARY	1 <sup>EG</sup>	PSIG <sup>UT</sup>	0 <sup>G1</sup>	5 <sup>N_PRE</sup>	4 <sup>N_D</sup>	5 <sup>N_80</sup>	4 <sup>N_PST</sup>	23420 <sup>SPC</sup>	0 <sup>SPB</sup>	
CURRENT	1	CUI-001	0	32767 <sup>PBE</sup>	32767 <sup>D</sup>	32767 <sup>80</sup>	32767 <sup>PST</sup>	0.000000 <sup>CD</sup>	1.000000 <sup>C1</sup>	Test Channel 1
ANCILLARY	2 <sup>EG</sup>	DegR <sup>UT</sup>	0 <sup>G1</sup>	0 <sup>N_PRE</sup>	0 <sup>N_D</sup>	0 <sup>N_80</sup>	0 <sup>N_PST</sup>	0 <sup>SPC</sup>	0 <sup>SPB</sup>	
CURRENT	2	CUI-002	0	8319 <sup>PBE</sup>	8404 <sup>D</sup>	8392 <sup>80</sup>	8321 <sup>PST</sup>	886.795410 <sup>CD</sup>	-344.591949 <sup>C1</sup>	Test Channel 2
ANCILLARY	A <sup>EG</sup>	DegR <sup>UT</sup>	0 <sup>G1</sup>	195 <sup>N_PRE</sup>	187 <sup>N_D</sup>	154 <sup>N_80</sup>	159 <sup>N_PST</sup>	-11 <sup>SPC</sup>	0 <sup>SPB</sup>	
CUR							85 <sup>PST</sup>	55.478905 <sup>CD</sup>	-84.392159 <sup>C1</sup>	Test Channel 3
ANC							N_PST	-47 <sup>SPC</sup>	0 <sup>SPB</sup>	
CUR							988 <sup>PST</sup>	426.630859 <sup>CD</sup>	-73.618820 <sup>C1</sup>	Test Channel 4
ANC							N_PST	-54 <sup>SPC</sup>	0 <sup>SPB</sup>	
CUR							548 <sup>PST</sup>	393.379669 <sup>CD</sup>	-110.711685 <sup>C1</sup>	Test Channel 5
ANC							N_PST	-36 <sup>SPC</sup>	0 <sup>SPB</sup>	
CUR							919 <sup>PST</sup>	-234.164505 <sup>CD</sup>	35.502769 <sup>C1</sup>	Test Channel 6
ANC							N_PST	113 <sup>SPC</sup>	0 <sup>SPB</sup>	
CUR							295 <sup>PST</sup>	-332.067383 <sup>CD</sup>	-16958.101562 <sup>C1</sup>	Test Channel 7
ANC							N_PST	0 <sup>SPC</sup>	0 <sup>SPB</sup>	
CURRENT	8	CUI-008	1	-32768 <sup>PBE</sup>	59 <sup>D</sup>	60 <sup>80</sup>	-32768 <sup>PST</sup>	-82.248108 <sup>CD</sup>	4518.101074 <sup>C1</sup>	Test Channel 8
ANCILLARY	A <sup>EG</sup>	DegR <sup>UT</sup>	0 <sup>G1</sup>	0 <sup>N_PRE</sup>	5 <sup>N_D</sup>	4 <sup>N_80</sup>	0 <sup>N_PST</sup>	0 <sup>SPC</sup>	0 <sup>SPB</sup>	
CURRENT	9	CUI-009	0	602 <sup>PBE</sup>	640 <sup>D</sup>	-1434 <sup>80</sup>	645 <sup>PST</sup>	3.381169 <sup>CD</sup>	-1.948625 <sup>C1</sup>	Test Channel 9
ANCILLARY	B <sup>EG</sup>	DegR <sup>UT</sup>	0 <sup>G1</sup>	91 <sup>N_PRE</sup>	120 <sup>N_D</sup>	142 <sup>N_80</sup>	103 <sup>N_PST</sup>	-2075 <sup>SPC</sup>	0 <sup>SPB</sup>	

# Overview



- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

# Overview



- ◎ Context
  - NDAS
- ◎ NOSS
  - Nodes
  - Form Validation
- ◎ NCAL
  - Calibration Report
- ◎ Other
- ◎ Questions

Thank You

